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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/552,663	10/11/2005	Juha T. Rantala	LAIN-102	2587

7590 03/17/2008

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EXAMINER	
RODGERS, COLLEEN E	
ART UNIT	PAPER NUMBER
2813	

MAIL DATE	DELIVERY MODE
03/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/552,663	RANTALA ET AL.	
	Examiner	Art Unit	
	Colleen E. Rodgers	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23,46 and 48* is/are pending in the application.

4a) Of the above claim(s) *23 and 46* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7,8,14-22 and 48* is/are rejected.

7)☒ Claim(s) *6 and 9-13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/28/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 23 and 46 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species and invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11 February 2007.

Claim Objections

2. Claim 1 is objected to because of the following informalities: add a period at the end of the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-5, 7, 8 and 14-22 are rejected under 35 U.S.C. 102(b) as being anticipated by **Sagiv et al** (US Patent Application Publication 2003/0021967).

Regarding claim 1, **Sagiv et al** disclose a low dielectric constant polymer, comprising monomeric units derived from a compound having the general formula I:

$(R^1\text{-}R^2)_n\text{-Si-}(X^1)_{4-n}$,

wherein

each X^1 is independently selected from inorganic leaving groups, specifically halogens, preferably chlorine,

R^2, being optional, is excluded,

R^1 is a polycycloalkyl group and

n is 3 [see paragraph 0026].

Regarding claim 2, **Sagiv et al** disclose the polymer according to claim 1, wherein the organic content of the polymer is in the range of 30-70 wt%, preferably higher than 48% [see paragraph 0026].

Regarding claim 3, **Sagiv et al** disclose the polymer according to claim 1, wherein R^1 is a polycyclic alkyl group having from 9 to 16 carbon atoms [see paragraph 0026].

Regarding claim 4, **Sagiv et al** disclose the polymer of claim 3, wherein R^1 is a cage compound [see paragraph 0026].

Regarding claim 5, **Sagiv et al** disclose the polymer of claim 4, wherein R^1 is adamantyl [see paragraph 0026].

Regarding claim 7, **Sagiv et al** disclose the polymer according to claim 1, wherein the inorganic leaving group is halogen [see paragraph 0026].

Regarding claim 8, **Sagiv et al** disclose the polymer according to claim 1, wherein the polymer is obtainable by homopolymerization of compounds of formula I.

Regarding claims 14, 15, 18-21, **Sagiv et al** disclose the polymer of claim 1. While **Sagiv et al** do not disclose: wherein the total sum dielectric compounded at 1 MHz is 2.50 or less, preferably 2.1 or less; wherein the orientational dielectric constant of the polymer is 0.4 or less; wherein the dielectric constant of the dielectric material after curing is 2.50 or less, preferably 2.30 or less; wherein the porosity of the dielectric material is less than 20%, preferably less than 15%; or wherein

the average pore radius is less than 1 nm, **Sagiv et al** disclose the polymer, which is assumed to inherently possess these characteristics.

Regarding claim 16, **Sagiv et al** disclose the polymer of claim 1, wherein the oxygen content of the polymer is less than 15 atomic% [since **Sagiv et al** disclose adamantyl trichlorosilane, $C_{10}H_{16}SiCl_3$, the atomic% of oxygen is 0].

Regarding claim 17, **Sagiv et al** disclose the polymer of claim 1, wherein the carbon content of the polymer is more than 25 atomic%.

Regarding claim 22, **Sagiv et al** disclose a low dielectric constant polymer, comprising monomeric units derived from a compound consisting of adamantyl trichlorosilane [see paragraph 0026].

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Sagiv et al** (US Patent Application Publication 2003/0021967) in view of **Reid et al** (US Patent Application Publication 2005/0064726). **Sagiv et al** disclose a method for forming a dielectric material having a dielectric constant of 2.6 or less, on a semiconductor substrate, comprising the steps of:

introducing the monomeric depositing material on a semiconductor substrate, said deposition material formed from a precursor material comprising a silicon-containing chemical compound having the formula I as defined in claim 1 [see paragraph 0026];

forming a siloxane polymer film from the deposition material; and

thereby forming a material on the semiconductor substrate having a relative dielectric constant lower than 2.6 [while **Sagiv et al** do not disclose the relative dielectric constant, **Sagiv et al** disclose the polymer, which is assumed to inherently possess this characteristic].

Sagiv et al are silent as to the deposition method and curing process. **Reid et al** disclose a process of forming a silicon-containing dielectric material from the same precursor as was taught by **Sagiv et al**, namely adamantyl trichlorosilane [see **Reid et al**, paragraph 0111 and the formula below it], wherein the precursor is applied to a substrate by CVD and polymerized and densified by a curing process [see paragraph 0088]. One of ordinary skill in the art would have been motivated to look to one such as **Reid et al** to teach the missing details of **Sagiv et al** because a person of ordinary skill would know that these processes are well-known in the art.

Allowable Subject Matter

7. Claims 6 and 9-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: regarding claim 6, the prior art fails to teach or make reasonably obvious wherein the adamantyl or diadamantyl is substituted with 1 to 3 alkyl substituents; regarding claim 9, the prior art of record

fails to teach or make reasonably obvious wherein the polymer is obtainable by copolymerization with a compound of formula II.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen E. Rodgers whose telephone number is (571) 272-8603. The examiner can normally be reached on Monday through Friday, 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Carl Whitehead Jr./
Supervisory Patent Examiner, Art Unit 2813

/C. E. R./
Examiner, Art Unit 2813